THE NEON NEWS

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THE ESSENCE OF NON-INCANDESCENCE

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A cool burn:
How to anneal your tubes and find inner peace

By Mark Snyder

Annealing, relative to glass, is a heat treatment to relieve stress due to flame working or forming, by heating the entire piece to just below the visible softening point (annealing range) and then allowing the glass to cool very slowly, so that at any given moment the entire piece is at the same temperature.

To understand annealing, you have to understand strain. When glass is heated it expands; when cooled it contracts. The rate of cooling depends on the thickness of the glass; thicker glass cools slower. In a bent glass tube, the outside radius of the bend cools first because it is thinner. Also, the area around the bend cools sooner because it didn't get as hot as the bend itself.

After the outside of the bend cools, it is solid and can't adapt to the contraction of the still-cooling glass inside the bend; this is "cooling stress."

If the stress is severe enough, as it often is with "classic colors," the bend will crack to relieve the strain. This can happen anytime from the initial cooling to years later, in which case it is called "fatigue failure."

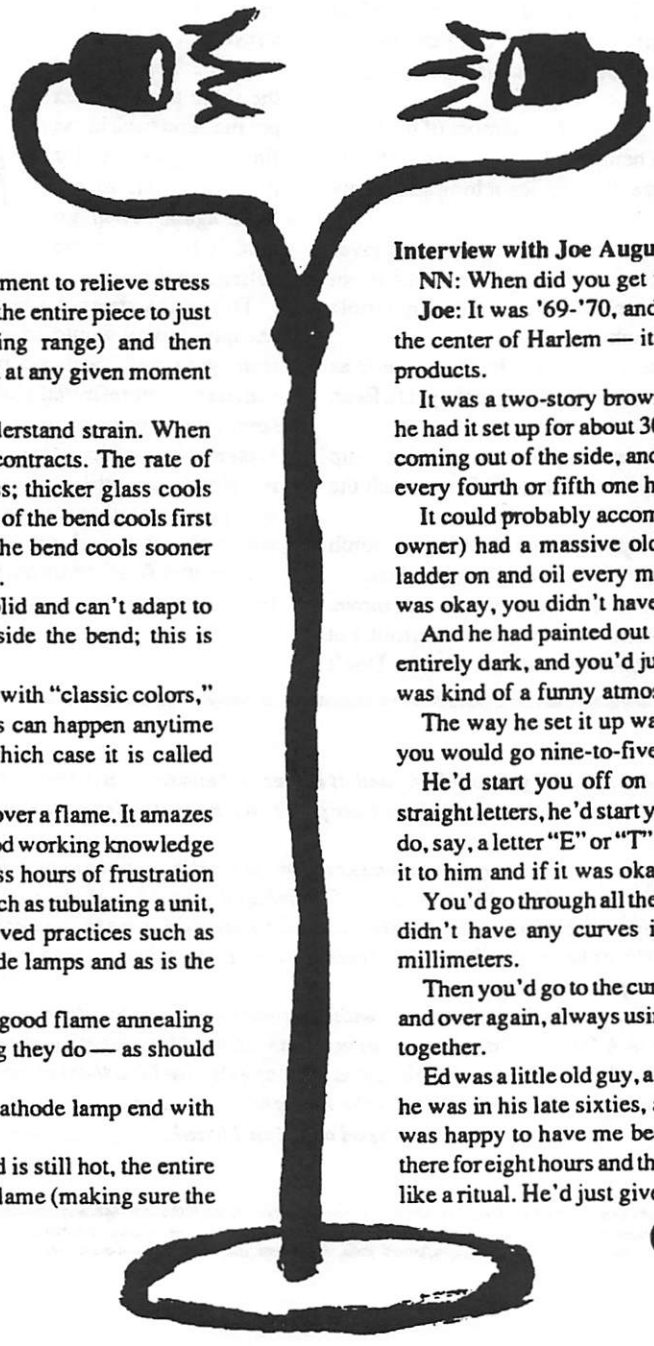
Annealing can be done either in an oven or over a flame. It amazes me how few benders in this country have a good working knowledge of proper flame annealing. It can save endless hours of frustration in performing simple everyday procedures such as tubulating a unit, working with colored glass, and more involved practices such as right-angle electrodes as used on cold cathode lamps and as is the norm in other countries.

All scientific glassblowers must rely on a good flame annealing technique, and habitually use it on everything they do — as should neon glassworkers.

To describe the procedure I'll use a cold cathode lamp end with a 90-degree electrode.

After the electrode is sealed on and the end is still hot, the entire "T" seal is rotated uniformly in a soft bushy flame (making sure the

(see Annealing, page 8)



Egani days:
The famous school's last graduate tells all

Interview with Joe Augusta

NN: When did you get there, and what was it like?

Joe: It was '69-'70, and it was on 125th Street, which is right in the center of Harlem — it was above a place that sold hair-curling products.

It was a two-story brownstone, about a thousand square feet, and he had it set up for about 30 students. Each student had a little bench coming out of the side, and a little pipe to your crossfires, and about every fourth or fifth one had a ribbon burner.

It could probably accommodate about 40 students. Ed (Seiss, the owner) had a massive old root blower that he'd climb up a little ladder on and oil every morning. It made a horrible noise, but that was okay, you didn't have to talk anyway.

And he had painted out all the windows in the whole place; it was entirely dark, and you'd just work with a couple of light bulbs. So it was kind of a funny atmosphere.

The way he set it up was that it was a three-month course where you would go nine-to-five, five days a week.

He'd start you off on letters, different letters: you'd work on straight letters, he'd start you off on nine millimeter, and if you could do, say, a letter "E" or "T" or "L" or something like that, you'd show it to him and if it was okay you could go up to the next size glass.

You'd go through all the "t"s, "e"s, "i"s, and "n"s, those letters that didn't have any curves in them, you'd do them in all different millimeters.

Then you'd go to the curves — do all the curves the same way over and over again, always using just clear glass. And then you put words together.

Ed was a little old guy, a James Cagney type. By the time I got there he was in his late sixties, and at the time I was the only student. He was happy to have me because, well, if I wasn't there he'd just sit there for eight hours and then he'd go home; he maintained the school like a ritual. He'd just give me a lesson, and then he'd go back — he

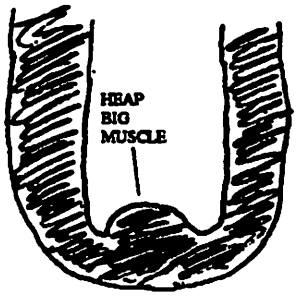
(see Egani School, page 6)

Stress, muscle-bends & powder, powder everywhere

By Ted Pirsig

It may seem weird, but one of the best ways to deal with bad bends is to learn how to do them consistently.

For example, there's the classic "muscle bend," every beach-goer's favorite. In my first year of bending I had days where no matter what, a few would sneak up on me (more than a few, to be honest.)



It finally dawned on me that instead of always striving to make a correct bend (and getting madder every time I couldn't), if I focused on deliberately making it bad I'd have a good chance of learning just what it was I was doing wrong. (It turns out that, in order to be consistently muscle-bound, you need to heat too much on what will be the inside of the curve.)

So take an analytical approach, and ask questions to yourself about what might be happening. Most important, take time out to experiment and try different things. You've got to unhook from the "I'm going to get this job done now" mind-set...

Recently a visitor to our shop said that a fair number of his tubes would go dead within a day or so of being made, and it seemed likely that his problem was the same one I'd had for a long time: tiny cracks in the tubulation.

Funny how creative you get in such situations: I told my employer at the time — and I truly believed — that "there's got to an incredibly small leak in one of the welds, and it will be impossible to find. The only thing to do is remake the unit."

And we would. Also, I was always cautious to let tubes age-in as long as possible, to make sure they still worked when they left. Even so we'd get returns within a week or so.

The solution is to make sure you're not getting a thick build-up of glass at the tubulation. The way to do this is to first stretch the tubulation out, then seal it off.

1) Heat the tubulation with the tipping torch, moving the torch around a small area, trying to get the heat evenly on the glass.

2) When the tubulation glass softens, the tube will start to move. As soon as you can, pull the neon unit away from the manifold, but stop once the tubulation has stretched out several inches. Don't apply heat while pulling it out. After pulling it you should have a very skinny, but still open, tubulation.

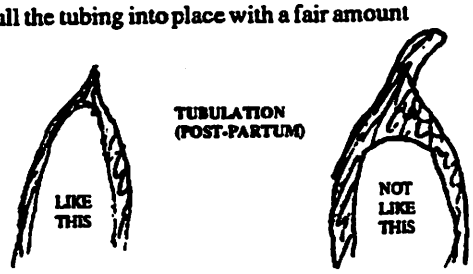
3) Lightly reapply the torch to the electrode end of the stretched glass and pull the tube off. Ideally there will be no place where the glass is thick, and it will come to a nice blunt point.

(If you're having a klutzy day you might repump one or two, due to the stretched (and delicate!) part breaking before you do the final sealing off.)

Fun with stress: There's nothing quite like scoring a piece of glass next to a previously bent area, and watching it shatter when you try to snap it apart. (This is the "three steps backward" phase; now you may have to remake the letter, and when you go to cut that unit off the whole thing slips and smashes, falling on yet other glass on the bench...)

To reduce the stress in the glass (and you), it's helpful to get the bend into its final position while it's still fairly fluid, and then hold it in place while it sets.

If instead you have to pull the tubing into place with a fair amount of effort, you lock in stress. Sometimes this can't be helped, and the thing to do is then put the bend back in the flame, long enough for it to just start to get fluid again. Then go hold it back over the pattern, in the correct place. Helps immensely.



To see the stress, build a polariscope. To build a polariscope cheaply, theory would have it that you take two polarizing filters from your neighborhood photo supply shop (they are used on cameras to cut reflected glare), and use one filter to cover the light source while using the other one to cover your eye. Look at the bent glass and look at the nifty moire or rainbow patterns where the stress is. (Note I say "theory:" this didn't work for me, and I can only conclude that either my glass has no stress (ha) or the light source isn't right, or something -- more on this in the future.)

Stronger finished units: It really helps to remove enough powder from the welds. If it's block letters, say, and the welds will all be

(see Basic, page 7)

Dear tubeheads,

We're looking forward to meeting some of you at NESA, and at a special benders' party there (see Bulletin Board). It should be a good time, thanks to Eileen Romano, who had the idea and offered her place. We hope it will spark more benders' gatherings, even if we can't cross the ocean to attend them.

The war's over and postponed jobs are coming in, but the weeks of sparse work gave us time to read the 1920s and '30s Claude Neon News (xeroxed copies by way of Todd Warner and Bob Madden, both of Minneapolis, and Jan Murray of the New York City Public Library). You will see some light-hearted fillers from it, but there was a darker side too: you could sense the writers' thinly-veiled desperation as the Great Depression persisted, despite all their cheery predictions and celebrations of America's strength and world leadership. The haunting part was how much it sounded like newspapers today...

We welcome new contributors: Edward DeZuzio deluges us with copy and cheer from Shadowmaker Neon in W. Patterson NJ; Chris Meyer hails from Ultimate Neon in Tucson AZ; Craig Rasmussen can be seen watching late-night neon reruns in San Jose CA; and neon veteran Bob Lind writes to us from Windham NH. To these new voices and old "angels" we lift a toast of our abundant rainwater (we have a 15,000 gallon cistern of it to share, if you're in the neighborhood -- the drought is over and the monsoons are back.)

Bend and don't break,

Ted + Val

The Neon News is published quarterly by Ted Pirsig and Val Crawford, P.O. Box 668, Volcano, Hawaii, 96785; (808) 967-7648. Subscriptions are $15/year U.S., $17/year Canada, and $19/year foreign, payable in U.S. currency. Single issues are $4. No advertising is accepted, except for classifieds, which are available to subscribers only at $.25 per word. The Neon News welcomes stories, artwork, photographs, letters, ideas, suggestions, irate comments and old, burned patterns.

Neon down under: Or, no cross-fires under the Southern Cross

By Michael Blazek

One of the first things I noticed when I walked into a neon shop in New Zealand was that there were no cross-fire or cannon-fire torches.

It is much the same in Australia. All glass bending is done on a standard Hyde model 580, usually hooked up with a pilot light igniter and an Edwards rotary blower. All welding of glass and electrodes is done with either a fishtail hand torch or a single-jet, hand-held oxygen torch.

This may seem like a slower process — and it usually is — but most shops run off of bottled LP tanks, and the Edwards rotor has limited c.f.m. output. The combination of lower-pressure gas and air supplies has led to cross-fires never making inroads down here. Also, because the bending techniques stem from the "English method," cross-fires were not included from the start.

The oxygen hand torches, available in Masonlite and Eurocom supply catalogues (see illustration), are awkward at first because the single flame needs to be rotated around the complete diameter of the tube.

"I've been using a torch like this for years to seal up holes that have been blasted through on the bombarder. Instead of starting over when I arc tubes through, I slowly anneal the arc holes, then adjust the flame and pin-point the holes."

They do have a few advantages in the long run though.

When the LP lever is ignited and turned up, a buffeting, relatively cool flame results, because the flame is a mixture of LP gas and bottled oxygen. (The torch has a mixing lever for each component.)

This flame is perfect for annealing, although LP is quite dirty compared to butane and leaves dark soot deposits on the glass. Fortunately these wipe off with a rag.

Once the tubes are annealed in a low flame, the gas is turned back on and oxygen mixed in until a needle-like flame about three to four inches results. This flame will burn about 1100° Centigrade, making welding a quick proposition.

What's more, it can be used to weld and spot-anneal Pyrex glass. Side-tubulating is as easy as gas annealing, by first holding the mixed flame against a tube for about four seconds and then puffing the hole out. Again, a soft gas flame will perfectly anneal your work.

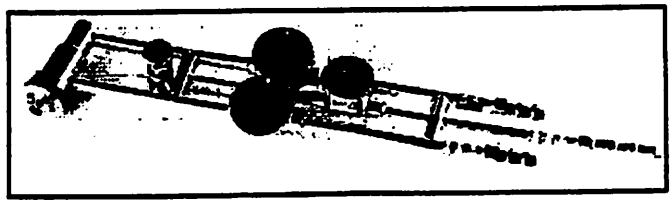
I've been using a torch like this for years to seal up holes that have been blasted through on the bombarder. Instead of starting over when I arc tubes through, I slowly anneal the arc holes, then adjust the flame and pin-point the holes.

By breathing in and out through a blowhose the hole will cover up. I've even managed to seal up both holes at the same time by using a slightly bushy flame that covers both holes. A real time-saver!

Arcing units through is not much of a problem here, though, due to the other major difference in bending down under. The Masonlite "Mark" series of complete bombarding and pumping units are the norm, not the exeption.

These all-in-one units resemble a Fast Lap video game, complete with steering wheel and windshield, and are a joy to work with.

The inclusion of milliameter, millibar (for back-filling), temperature and final vacuum micron guages take all the guesswork out of pumping. Processing electrodes to different mA ratings is easy, and monitoring the tube pressure with the millibar guage makes it very difficult to arc units. The rising pressure signals an unstable condition, usually due to de-gassing, and the vacuum stopcock is quickly opened, relieving the pressure and evacuating the gases before they reabsorb onto the electrodes, glass or phosphors.



Hand torch (from a Masonlite catalogue)

The filling, temperature and micron guages make it easy to process the units to a proper vacuum at the same temperature and final gas pressure when filling.

In short, this makes for uniform, high-quality tubes. The different models of the Mark series have included various diffusion pumps and the new models feature turbo pumps and a dual pumping setup option.

Even the pumping units that are hand-made here incorporate mechanical "roughing" and diffusion "fine" pumping combinations, along with the previously mentioned instrumentation for quality control.

Most bending tables have a V-shape cutout on the front middle, large enough to twirl a hand torch through the cutout without bumping. The neon units to be welded can be located over the cutout without hanging over the edge of the table.

A poor-quality fiberglas substitute for Transbestos III is used for patterns, but because it irritates benders' forearms, paper patterns and brass screen are substituted.

Up until recently, Masonlite was the only supplier here, but Neon Products from Germany has made inroads, especially in electrodes, glass and transformers, and EGL products are now available, giving neon shops here a wider availability of stock at better prices.

Transformers for the most part are imported from Hong Kong and tend to be a bit larger because of the 240 volt capability. Masonlite features an Italian-made tranny that has an installation box already around it. Neon Products offers plastic-cased versions from 2,000 to 8,000 volts and metal versions made in Brazil from 9,000 to 15,000 volts.

The Enhance solid-state transformer from Taiwan, recently available in the States, is also very popular for interior signage, and comes in an exterior model; voltages vary from 4,500, 9,000 and 15,000 volts secondary and 240 volt primary. Lumintech and Neon Dynamics are two U.S. distributors, but prices are steep.

On installations, very few jobs use housings when penetrating an exterior shop front. The individual neon unit electrodes are simply double-backed and loops of GTO in hand-made glass sleeves are jumped from one unit to the next.

If the units penetrate, they usually go through a ceramic or vinyl

(see Down Under, page 7)

Electrical workers face higher cancer risk

We're still researching electromagnetic hazards in neon shops: the stack of articles, books, letters and references is a foot tall already, but it's maddening to try to draw conclusions. Some experts swear that the juice put out by a neon transformer is enough to scramble our genes and expose us to serious health risks; others pooh-pooh this, and yet others stonewall with the old "there's not enough research yet" (despite dozens of studies).

But everybody we interviewed agreed that it's a good idea to keep kids and pregnant women away from bombarders, because developing bodies are so vulnerable to what the medical literature quaintly calls "insults." We'll share some of what we've found, and hopefully by next issue we'll have some actual measurements of fields in a few shops, and some expert comment on how they could affect our health.

Science, 7 Sept. 1990: In contrast to the uncertainty about residential EMF exposures, the picture that emerges from occupational studies is sharp. Again and again, epidemiologists have found that workers in various electrical jobs have higher risks for various types of cancer, particularly brain and nervous system cancers as well as leukemias. In a recently finished case-control study in the Los Angeles area, for instance, Susan Preston-Martin and Wendy Mack at the University of Southern California found that men who had worked for ten years or more in a variety of electrical occupations had a ten times greater chance of getting brain cancer than men in the control group. "Employment in these occupations is definately conferring some type of risk," Mack says, but "we don't know whether EMFs are to blame."

...One widely-noted study, performed by Genevieve Matanoski of Johns Hopkins University, did find a dose-response relationship for cancers in male New York Telephone employees from 1976 to 1980. Matanoski measured the average magnetic field exposure among different types of employees and found that cable splicers had by far the largest doses, followed by central office employees and then installation and repair workers.

When she compared cancer rates among the various types of employees, she found an ominous result: Cable splicers were nearly twice as likely to contract all types of cancer as company employees who did not work on telephone lines, with the risks for leukemia and lymphomas being particularly high. Among central office workers, who are exposed to short, intense fields from telephone switching machinery, the rates of several cancers were unusually high, although not as high as for the cable splicers.

...(Another study found that) men whose jobs invloved some exposure to EMFs were nearly twice as likely to have breast cancer as those men with no exposure, and men likely to have the highest exposures — electricians, utility linemen, and power plant workers— had six times the risk of developing breast cancer as men who worked in occupations with no EMF exposure.

Paul Brodeur, New Yorker, July 9, 1990:

...(D)uring the past ten years nearly two dozen epidemiological studies have been conducted and published in the peer-reviewed medical literature here and eleswhere in the world, showing that electricians, power-station operators, power and telephone linemen, and other workers whose occupations expose them to electromagnetic fields develop and die of leukemia, lymphoma, brain cancer, and brain tumors at rates that are significantly higher than those observed in unexposed workers.

(One authority, Louis Slesin,) pointed out that, according to a study in the medical journal The Lancet, brain-cancer deaths had tripled among older white men and women in the United States between 1968 and 1983, and he went on to list no fewer than twelve studies conducted, published, or reanalyzed between 1985 and 1989 that showed significantly increased rates of brain tumors among people exposed to electric and magnetic fields at home or at work.

...Particularly disturbing were the results of a study published in 1989 in the International Journal of Epidemiology by Christine Cole Johnson ... and Margaret R. Spitz... They found that children whose fathers were electricians ran three and a half times the risk of developing tumors of the central nervous system that other children ran; indeed, tumors of the brain stem had been diagnosed in no fewer than four of seven children of electricians in their study population.

...Laboratory studies of lymphocytes from a sample of high-voltage substation workers in Sweden indicate that chromosome

The picture that emerges from occupational studies is sharp: electrical workers face a variety of long-term risks.

breaks and aberrant cells are significantly more common among these workers than among a control group of unexposed men.

The response of the electric-utility industry to this growing body of evidence scarcely seems designed to enlighten the public about the power-line hazard. Last year, the Edison Electric Institute of Washington, D.C. — an association of electric companies — published a brochure stating that measurements of behavior and brain function in animals exposed to power-line electromagnetic fields showed 'some small effects that may be the result of body rhythm changes,' but that 'the connection between these laboratory results and human health is not known.'

As for the federal government, its response to growing evidence that the magnetic fields from power lines pose a public health hazard has been cautious at best and irresponsible at worst. Thanks to budget cuts imposed by the Reagan Administration, a promising program of investigation into the biological effects of extra-low-frequency (ELF) electromagnetic fields, which had been under way for ten years ... was shut down in 1986. Since that time, almost no funding has been made available by the EPA for research in this area...

(Yet EPA) staff had recommended in the initial draft report that ELF electromagnetic fields be classified as 'probable human carcinogens,' and that this classification had been deleted from the executive summary of the EPA report after a meeting, on March 6 (1990), between agency official and the White House Office of Policy Development. ...The classification ... would have mandated measures to protect the public health...

AP, mid-Dec. 1990:

"White House fears of unduly alarming the public have delayed until next week the release of an Environmental Protection Agency report linking electromagnetic fields to leukemia and brain cancer in children, the EPA says.

..."They were concerned not about the accuracy of the report," said Robert McGaughy, who supervised the report's preparation. 'They were concerned about how people would react to the news."

...Some EPA scientists were angry about the delay, said David Bayliss, one of the report's authors. It initially was scheduled for release Nov. 27, he said. 'What's the use of having an Environmental Protection Agency if you're going to withhold information from the public?' Bayliss said. 'I thought the EPA was for letting people know about health problems, or possible health problems.'

Health hazards in phosphor coating

Editors' note: With one of the brighter "color checkers" (like Voltarc's) turn out the lights at the end of your working day and walk around the glass room, checking out different surfaces. That supposedly clean workbench will likely blind you with remaining bits of phosphor, and if it's been a lively day you'll light up your own skin and clothes too. Pretty, eh? And poisonous too.

Just a few issues ago, we used the term "industrial hygiene" with a grain of salt. No more; the deeper we dig into shop safety, the more we wish we had a friendly relationship with some industrial hygienists, so we could tempt one into our shop to measure various smells, auras and messes.

We aren't the only worryworts; with a recent glass order we recieved "material safety data sheets" (MSDSs) running to nearly a hundred pages of chemists' jargon. We asked for an interpretation from chemical engineer (and nighttime tubebender) Phil Baker, and he did additional research and wrote this. He says he's "not an industrial hygienist but can speak the language"; he's willing to answer other chemical safety questions, so send them in.

By Phil Baker

There are two potential hazards to consider when working with glass tubing coated with flourescent powders — the powder and the glass itself.

Americans use lead glass more commonly than soda (or lime) glass, which is mostly seen in "classic" colored tubes. The main ingredient of both glasses is silica (SiO_2). Lead glass is roughly 58% silica, 35% lead oxide, with the remainder being potash and soda ash. Soda glass is about 70% silica with the remainder being lime and soda ash; it has no lead compounds. This is why it bends differently.

Before discussing the hazards associated with tubing, it is necessary to understand the terms used to describe exposure. "PEL" means permissible exposure limit, and "TLV" means threshold limit value; they mean basically the same thing, but the two terms were established by different agencies. OSHA uses PEL, and TLV is used by the American Conference of Governmental Industrial Hygienists. They both represent the maximum level of exposure that is safe for an eight-hour period.

Information about premissible exposures for any material can be found on the material safety data sheets (MSDSs) available from suppliers. The majority of the information for this article was obtained from Voltarc's MSDS set.

The main hazard associated with the glass tube itself is inhalation of glass dust generated by cutting or grinding. Since most neon shop cutting is done by scoring and snapping, there isn't much dust to worry about. But if you cut glass with a saw (usually with a diamond-tipped blade), you may exceed the PEL in a short time; in a 20-by-20-foot room, the dust from three cuts of a 12mm tube with a 1/8" blade will exceed the standard for silica dust. Since the limits for lead oxide is lower, it takes only one cut to exceed the PEL for that. But remember that PELs are time-weighted eight-hour exposure averages, so frequency of cutting and ventilation are both factors. If your ventilation is adequate you could make many cuts without exceeding the limit.

If your shop generates much glass dust, it is wise to be aware of your exposure and take precautions. You can test your air for dust contamination using air sampling pumps and cartridges; you can buy these for about $500, or have an industrial hygienist (listed in big-city yellow pages) come in and test for you while glass is being cut.

You can also take protective measures such as wearing a respirator to filter out the dust; there are many styles available and they usually cost only $25-$35; you'd want to use it with a "nuisance dust" cartridge. Overexposure to glass dust can lead to silicosis (much like "black lung") and lead poisoning.

A second worry is lead fuming (vaporization) when heating and working with lead glass. The exact temperature that lead begins to vaporize from glass is not well established, according to the sources I talked to, but it begins to occur over the softening point (1166) and probably increases at the working or liquid point (1805F). Thus lead vapors are probably present in the neon shop, but it's difficult to determine whether this is a health risk, since different rates of ventilation affect the amount of vapor present in different shops. You can test for lead vapor too, but until the glass manufacturers give further information and more research is done, ventilation is the key to fighting lead fumes, as well as dusts, carbon monoxide and mercury vapors.

<The MSDS states: "...The fumes given off at high temperature are capable of producing chronic effects, such as cramps, fatigue, loss of appetite, diarrhea, anemia and in severe cases central nervous system and kidney damage and possible adverse effects on the reproductive system." The melting point is 730C; "If exposed to 800C in air, some constituents decompose to form toxic fumes of CdO, znO, so2 and lead.">

As for phosphor coatings, many different mixes are used to create different colors. These are inorganic compounds of calcium, barium, cadmium, zinc, and magnesium, with activating agents such as the metals manganese, lead, europium, yttrium, germanium and antimony.

Each of these chemicals has hazards associated with them, and in many cases it is unknown whether the compounds used are more or less toxic than the individual chemical components. The exposure limits for the phosphors are generally based on the main element's toxicity.

For example, the MSDS for Neo Ruby tubing lists phosphor 037 as comprising up to 6% of the total coating weight. Further, 21-23% of phosphor 037 is made up of barium compounds, and barium has a TLV of 0.5 mg per cubic meter. The MSDS says the coat weight in Neo Ruby can be as high as a gram per foot of tubing. After a few calculations, you can conclude that it would take the amount of coating in five feet of Neo Ruby to exceed the TLV for barium in a 20-by-20-foot room, assuming no ventilation. It seems fairly unlikely that anybody would bolw the powder out of five feet of tubing in a typical working day.

But phosphor 060, used in Veep Green, is made of up to 99% cadmium compounds, which have a PEL of 0.1 mg per cubic meter. With the listed coat weight of two grams per foot of tubing, the same calculations say the coating present in only 1.5 inches could exceed the PEL.

These two calculations illustrate the difficulties in evaluating hazards; the best thing to do is be conservative and consider them all to be as hazardous as the worst ones. The Veep Green example is pretty much a "worst case," so if you are blowing around more than a couple of inches of coating from tubes regularly, you should consider changing your habits. Again, a respirator with a nuisance dust cartridge would be wise, and again, an industrial hygienist can test for phosphor dust.

So use common sense, and a lot of ventilation. And if you're covered with phosphors at the end of the day, then you may have a problem and you should deal with it, with testing or changed habits. As always, better safe than sorry.

A farewell to blowhose

By Bob Lind

With the awareness of the dangers of mercury, the tube bender need not have a blowhose tap into the manifold when splicing units onto it. By using 6mm glass you can just push the glass together to weld it on.

I've been tubulating with 6mm for about 25 years, which gives you a little more clearance at the splice (even if the walls collapse slightly), and generally allows for faster evacuation. Also this eliminates blowing moisture into the manifold.

With an arrangement like the drawing shown, there's no dead time for the pump man, as he's continually sealing on units and sealing off units at the branch stopcocks.

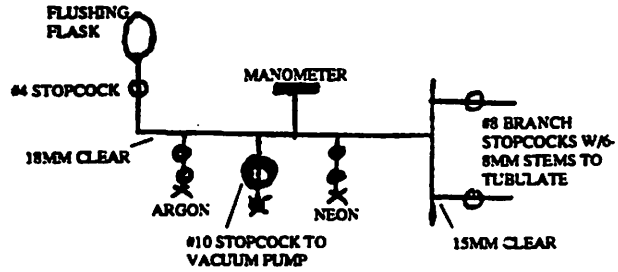
And with the branch stopcock closed the splice at the tubulation may even expand from its own heat expansion, especially short units that are at room temperature.

So we've eliminated a stopcock and eliminated blowing into the manifold.

The overall measurements are approximately sixteen to eighteen inches at the longest length, which gives us a very short run from the main stopcock to the branches. 18mm clear is also used from the main stopcock to the vaccuum pump.

Also, I've been buying Rocus fluorescent tubing in 5-10 pound lots (many sticks per pound) which is great for 11mm and smaller tubing.

Anyone know of a good 5500 white using the Voltarc tones?



View of manifold looking down

(Egani School, from page 1)

had this little office area — and he would sort of go to sleep. Then I'd call him and show him what I had done.

NN: When did it start? I know the school is old and famous, but do you know how old it was?

Joe: Mainly what happened is that Ed, he worked with people who were signbenders, this was in the '30s, and then he started taking in students in the early '40s. When the Second World War was over, all the soldiers came back, and it was just coincidental that neon was getting really popular and cheap to do. So the government helped him get started training veterans.

You'll find that most of the benders in this country, when you check when they learned neon, they go right back to '45 to '50, because they all went to school on the G.I. Bill.

So Egani is where everybody trained — all the pictures you see of this place, where you see fifty students working, they're all about the same age. The numbers started dropping off in the '50s, with plastic signs coming on...

NN: Were you the very last student?

Joe: I was the last one to finish. There was one more after me, a minister from upstate New York. I finished the class and got my diploma — he had this old Armenian friend who did the hand-lettering, and it looked very nice. The last student came when Ed was sick. He had a stroke and went to the VA hospital, and I remember visiting him in 1970. The person who was a student at the time made a deal with his wife and took all the equipment upstate. That's the last I ever heard of it.

NN: What do you think an ideal learning situation is for neon students? Was Egani's method a good one? Was there enough equipment there? I hear that in a lot of neon schools there isn't enough equipment, so people just stand around watching other people do things.

Joe: That's a function of the school's rip-off-ability. The more rip-off they are, the less burners they have, because it's going to be cheaper in the long run. It's an advantage to the school to set it up that way; they get the money up front.

What I had in my place was two students per burner, and they worked one on each side. And that was okay, but the best thing is one crossfire for every student. You should have, oh, one ribbon burner for every three; you want to keep them away from that because it's so easy to use...

I think the main thing they should work on is lettering, 'cause it's the best thing. I used to tell them it's the scales, and they have to practice scales before they sing. So they have to practice angle bends, drops...

NN: Even your art students?

Joe: Oh yeah! There was no difference: the art was in the head, but your hands have to be able to make bends... Eight hours a day, that's the best way to do it.

I think the way (Egani) set it up probably was the best. One burner for every student, and you just worked — no matter what you wanted to do, you learned a new skill, regardless of whether you wanted to be an artist or a signbender. .

NN: Are there certain things that you would recommend artists learn about neon, even if they don't intend to bend their own glass? Are there things they should know about the medium before they go charging around in it?

Joe: Yeah, they should learn how to do it. I know what you're asking — there's two different ways to do it. It seems like most people who are very successful at it have never learned how to work with the medium. So they look at it as just a means to an end.

I used to think that was the wrong way to do it, but I'm not so sure now. Once you get involved in the technique, you get a lot of crapola — a lot of people get interested in "well, how can I make this color a little bit different," or a lot of that stuff you see with one electrode now.

To me, that's going entirely off the wrong end of the board: you get so involved with the medium you forget why you're doing it. It becomes almost like an academic exercise: if you just work with the medium to see what it does, to make it do a little something new — that has nothing to do with the real world.

NN: It's kind of turf-building. You're building your own original turf in the medium.

Joe: Yeah, and that's wrong. And so, somewhere in between ... you have to not be afraid to get your hands dirty, but not get into the medium so much that you lose track of the larger picture. Because it is a very seductive medium, and it's real easy to make something that looks good.

I mean, you can have a neon group show with somebody who's been making neon for 10 years and somebody who's been making

(see Joe's Instant Neon, page 10)

Need a hand? Try a ratcheting choke

By Chris Meyer

A year ago I set up my own glass shop. I bought a Daco bombarder equipped with a sliding choke and a push-button switch.

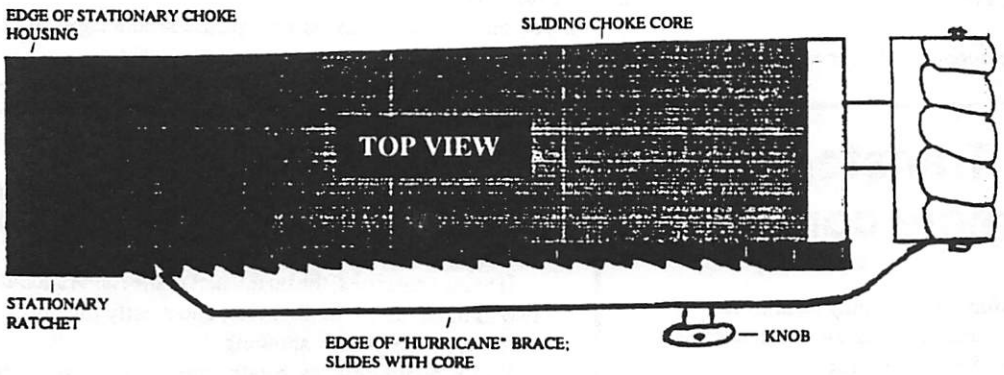
Real nice unit, but when you start using it, you soon realize it takes two hands. Reaching for a stopcock was impossible.

First I figured I could hold the choke out with pieces of wood cut to precise lengths. This was a simple cure: 1) push button, 2) pull choke, 3) insert block — with foot. Wrong!

OK, let's try putting the block in before we start processing: 1) insert block, 2) push button — wow! the bench jumps violently and the milliammeter doesn't know what hit it.

Well, there has to be a better way.

I could buy a foot switch but I don't like them; in my shop it's an accident waiting to happen. Besides, I often need to move around to keep from falling asleep.



After pondering the problem I decided I needed a locking mechanism for the choke. I heard an old-timer say something about a ratcheting choke once; this leads me to believe this is not a new idea, but having never seen one, I knew making one would be difficult.

Roaming around the hardware store, ideas started to come.

I needed two pieces of steel: one piece to have notches in it and the other to ride against it to catch the notches. The mechanism has to be very strong since most chokes have quite a pull.

I found an ideal piece of metal for the part with the notches: a rail used for adjustable shelving. These are channels about a half-inch wide with lots of slots; the slots on the rail would be the ones we use.

For the other piece, all I needed was a stiff piece of flat steel — a hurricane brace worked nicely. These brackets come in all shapes and sizes, so I picked a flat one about 2" x 15" and around 3/16" thick.

Figure A

OK, time to start putting this thing together. First take the shelving channel and cut a series of notches in it. I used my bench grinder with a coarse wheel. Don't overheat the metal and use a wire wheel to clean it up.

The notches should continue on the channel as far as you wish to pull the choke; see Figure A.

Cut the notches on both sides of the channel by rocking it up and down when grinding. Make the teeth as perpendicular as possible; you may need to true them with a mill file.

When you're satisfied, cut it to length and mount it on the side of your choke.

Next, bend the end of the storm bracket at a slight angle; this will catch the teeth. Mount this to the handle of the choke. Adjust it for a strong pressure against the teeth.

If all is working right, the choke should pull out and click over the teeth. When pushed in, the mechanism should catch. Be sure it catches real well or it will slip under load.

Finally, put a big cabinet knob on the storm bracket. The knob will give you a safe place to grab to release it. You don't want to get your fingers under the bracket; the teeth are sharp. Pull on the knob and slide the choke in.

The idea behind this mechanism is to ratchet to a desired position, stay securely in place and then easily release to slide the choke back in.

Try it.

(Basic, from page 2)

painted black anyway, remove a full twist with the cork. I even keep a size-larger cork handy (13mm for 12mm glass, say) to take a good wad out with one twist. If it's script and will be visible, try and place the welds at a point where the tube is running behind another tube, and take out only a small twist.

When pulling the powder out, be sure and get it all out; leave none on the face of the cut glass. I actually twist once, for a rough removal, point the tube to the floor and tap it, then blow on it a little and give it a final twist with the clean edge of a cork. (This is not quite as obsessive as it sounds, and results in welds hardly ever leaking.)

The best part of all this blowing and tapping of phosphorescent powders is taking the UV color-checker-light at the end of the day and turning out the lights; see Phil Baker's article (page 5) for some ideas on what mutants we'll all become.

(Down Under, from page 3)

collar just slightly bigger than the electrode diameter and are connected in the same manner behind the wall, with GTO in glass sleeves.

Work opportunities in Australia are limited because the industry is a small one relatively, and also due to Australian immigration policies.

New Zealand, on the other hand, has given opportunities for immigration-approved glass bending jobs to Dan Cuppy and Sam Cohen from the American School of Neon and my cousin, Scott Lucas, as well as myself. These have all come through a good friend who owns Neo Neon in Auckland.

Interested journeyman benders should send resumes to Neo Neon in care of John Wilson, and to myself at Neon Specialists, 12 Water St., S. Brisbane 4101, Queensland, Australia.

P.S. Bum steers and b.s. artists need not waste our time.

Look! Up in the sky! It's a cloud! It's a dogbone! It's...

By Nancy Hannmann

A little more to add to the Billie Lawless story:

The name sounded familiar when I read it a while back, but later I remembered, and called "Mr. X" (who asked to remain nameless), a venerable bender and mentor of mine, and asked:

"X, do you know Billie Lawless?"

"I remember I made a bunch of clear-red neon clouds for him, oh, I guess it must have been some six or eight years ago."

"Red neon clouds? What were they for? Did he say?"

"Ah, yeah, he said they were for an office ceiling, or something."

"Didn't it strike you as strange that an office would have red neon clouds installed on the ceiling?"

"Geez, I don't remember what I thought at the time, but now that you mention it, it does seem unusual now, don't it?" He paused, then added, "I do recall that the patterns were all cut apart in a strange way, 'cause they were hard to keep track of."

"X, do you want to know what you really made?"

"What d'ya mean?"

"I mean, X, that you did not make neon clouds. I mean that you really made 8-foot neon penises. You know, as in make genitals. Dicks, cocks, you know?"

"No kiddin'? ...You're kiddin' me, right?" he replied, shocked.

"No, X, I'm not kidding you. They went on to hang on an animated sculpture up in Buffalo, and after a big stink, they were cut down and shipped to Chicago, where they were offered a better welcome," I told him.

"You mean to tell me that I made eight-foot neon penises that went to Buffalo, and then went to Chicago? ... Well, I'll be danged... Eight-foot neon penises, huh?"

"Animated eight-foot neon penises, X, ANIMATED, just think: 'Dancing Dicks' in Chicago, and YOU made 'em," I gushed, knowing he was clearly impressed. He always did enjoy controversy and scandal.

"Ya got any pictures of it?" he asked, hopefully.

"No, I'm afraid not, but if I come across any, you'll be the first to see 'em, I promise."

And if you guys do come across any, please send a copy so I can show an old guy something to make him smile, OK?

Tubevision: Transformer trounces remote control

By Craig Rasmussen

If you use electronic transformers, you may be familiar with the interference that they can cause on radios, TVs, cordless phones, etc. Well, here's another weird effect:

Shortly after making and installing a small neon sign for my living room, I noticed that my TV remote control did not work. After a day of screwing around with new batteries and easterly facing incantation, I realized that my remote control worked fine with the sign off.

Initially, the effect was that with the sign on, the remote simply did not work. Later, I found that by placing the remote unit about one inch from the TV set sensor, I could get the "on-off" and "volume" functions to work.

And here's the weird part: when I pressed and released "volume up" the volume did indeed go up and kept on going up. At 95 decibels I dove for the on-off switch. Playing around with this effect, I found that, once triggered, I could get the volume to run away for both "volume up" and "volume down" functions.

My neon sign, which is made of about eight feet of 8mm clear, argon only, with a Neon Dynamics 3705B transformer, was placed about six feet from and in front of my TV set. Unfortunately, I was unable to experiment further since I gave my TV set away (I only watch neon now).

It is my understanding that TV set remotes work in the infrared part of the spectrum, so I don't know what the connection is with a 20KHZ transformer. Perhaps the remote unit is modulated in the 20HKZ range? I don't know.

The fact that an electronic transformer may cause failure of remote control functions, however, may be reason enough to consider this effect when making installations. (I am assuming of course that this phenomenon was not peculiar to my TV set; I think it was an RCA XL-100, about 1987 vintage.)

(Annealing, from page 1)

pinch seal on the electrode is not put into the fire) until the entire area is uniformly softened, although no visible softening is evident.

If using crossfires, the bushy part of the flame should be two to three inches in diameter, and mostly blue in color with very little yellow showing.

While continuing to rotate, move the worked area slightly out of the fire so it can begin to cool slowly. It is important to keep rotating the piece so it can cool uniformly.

After fifteen to twenty seconds, move the piece further away from the fire, and adjust the fire so that it is not so bushy, usually by adding more air.

Continue rotating the piece in the heat that is rising from the center of the fire for another ten to fifteen seconds.

It should then be set aside to cool suspended in the air — not on a cold table top. The entire process should take sixty to ninety seconds.

For the tubulation procedure, the flame annealing time can be shortened considerably, and should only require running the worked area through a slightly bushy flame four or five times, pausing a second or two between passes.

When working colored glass, such as ruby, the annealing time should be increased, and is dependent on diameter and the complexity of the work.

When sealing lead glass to soda glass (such as sealing on electrodes to colored tubing) the flame annealing procedure should be meticulously carried out due to the fact that different glasses have different expansion coefficients.

<Editor's note: Cut from this article was a short section on oven annealing; equipment for this (a "lehr", usually computer-controlled for temperature increase and decrease) can be found in nearly all glass labs and glassblowing facilities (universities, etc.), with information on their use available in books and from the people running them.>

THE LIGHTER SIDE OF NEON

Neon: The good, the bad, & the ugly

By Audie Foote

Part 1: The Bidding Process

Pardon me if I borrow from a movie title to express a few sentiments that have been floating around my head of late (in fact very late, usually about 3 or 4 a.m.).

You see, I've been battling insomnia the past few weeks, and invariably my mind ruminates on work. When you own a neon business, it's easy to lie awake, and roll around thinking — dwelling, I should say — on the Good, the Bad and the Ugly of the neon trade.

I know you can relate to this. Who doesn't lose sleep over difficult jobs and rotten clients occasionally? Well, it's nice to have company here; it's easy to feel like you're the only person in the world dumb enough to be awake at that hour.

So let me describe my particular brand of insomnia (without actually going so far that I reveal some form of neon neurosis; despite what you read, I think I'm pretty normal).

(2:45 a.m.:) THE GOOD. Geez, why did I wake up? It must be that $37,000 neon job I think I got. Well, he told me I was the low bidder, which means I beat out about six other companies. What a score! Neon for a whole mall — and it's all mine! Party time!

(2:47 a.m.:) THE BAD. Oh-oh, why was I the low bidder? Did I miss something? Was there a "Building B" that I missed?

Oh man, I hope when he said red neon he wasn't thinking RUBY RED! And that thing in the specs about dimmers — I'm sure I wrote in my proposal that those 47 dimmers were provided "by others"... didn't I?

And that ceiling neon — let's see, where can I get a 30-foot stepladder? And was that drywall or ceramic tile we have to drill through?

(2:51 a.m.:) THE UGLY. Oh my god! I'm going to get SUED! How the hell did I miss Building B, Ruby Red and 47 dimmers? I'm going to be a laughing stock all over town!

People will murmur, "You see that jerk? He screwed up that sign job for the new mall. Yep, the fool forgot about Building B. He was the low bidder by 82 grand! Bankrupted his whole company. Look at him now, walking around with his little paintbox, begging people to let him touch up their signs. Damn fool!"

(2:55 a.m.:) O.K., O.K., you gotta stop thinking like this. You went over those plans four times. Relax! Everything's all right. You won the job fair and square.

Think positive. That's it — relax so you can get some sleep. Think about what you're going to do with the profits of such a big job. New car maybe? Hmmm — how sweet it is!

(2:58 a.m.:) Oh no! I don't have enough transformers for this job, and I have, what, one box of electrodes left?

What'll I do if my vacuum pump blows out in the middle of all this? I haven't even looked at it in three years; what's that oil called? What did they mean by "velcro tube supports"?

(2:59 a.m.:) Will you quit worrying? You can buy all the supplies you need with the deposit.

(3:00 a.m.:) DEPOSIT? I don't think I asked for a deposit! No wonder I got the job — "Let's give it to this guy — he's the only one who didn't ask for a deposit. He's going to lay out $37,000 worth of work and material for us, and then wait six months to get paid, the fool."

(3:02 a.m.:) Oh why — WHY — did I bid on this job? You could've been happy doing those cute little window neon jobs and neon for channel letters, but NO-O-O-O-O, you had to be Mr. Voltarc himself and bid on the "megamall" job.

Oh, the horror!

(3:05 a.m.:) O.K., O.K., relax — you're getting yourself upset. Just think of the bright side. You're probably ripping them off. Yeah, that's right, it was a very good price.

I know — tomorrow I'm going to send him an itemized list of what I saw in the blueprints. Yeah, that's good. That'll cover me. No misunderstanding.

"Dear sir:

"The $37,000 I estimated in my bid proposal was for what I saw to be 2,000 feet of neon, installed. It does not include the electrical connection of the transformers, which must be handled by your electrician. Nor does it include any "Building B" I might have missed, or any damned Ruby Red, and while you're at it you can just forget about those stupid dimmers!

"Thank you."

(3:25 a.m.:) There, that's better — now please go to sleep!

What's the moral of this story? It's this: if you value your REM sleep you'll list exactly what your bid includes. Neon and sign specifications are almost always slighted on blueprints.

Why? Because many architects and designers are not adequately versed in the art of neon. Ambiguity runs rampant, and this can cost you big time if you're not careful.

So when you bid on neon from blueprints, do yourself a favor and list what you're bidding on. Somewhere there may be 47 dimmers you missed.

(3:40 a.m.:) Well, it's getting late so I'd better end this. I have to get up early and go down to the "megamall" and count buildings...

Sweet dreams!

To be continued in Part II, Customers and Money; and Part III, The Job — and Getting Paid.

Trusty 'trodes

By Edward DeZuzio

...Don't let price be the main reason for buying 'trodes. Cone-shaped shells, from what I see, are n/f/g. Ninety percent (OK, only maybe 75%) of all repairs that come in my door aren't broken. They are all in need of being re-processed on the bombing table. It is for this reason I would never use them.

I've used the ones that are crimped and I've watched the shell detach from the dumet during bombarding. I don't use them anymore. Also see a lot of repairs with these trodes where the shell does the same thing and ends up somewhere in the unit.

Since self-employment (Nov. '89) I insist on EGL's electrode man being stuck on my boxes of 'trodes. Flex leads don't corrode as easy and for about ten percent more it's worth the security of less service on new glass and repairs.

EGL also has 07 'trodes (8mm0); I've been told they can be used backwards to light tubulation (5mm0) although the right way seems to work better. The tubulated part of the 'trode looks like 2 or 3 mil.

Helpful hint: If you are going to delve into "tubulation illumination," keep the length (lineal not footage) of the glass under 36 inches, otherwise you'll end up with a melted, cracked, not working thing that stands in the corner. I did anyway. Maybe someone has access to miniature set benders?

A hot topic: Do fingers equal finesse?

By Renay Murray

You learn a lot in 17 years — mostly the hard way. So here's a few words regarding air drafts at your bending area.

In the last five years I've worked with five trainees. Every one of them had their "angle." You know, the spot where everything was perfect at their fires.

Yes, I've sat back and watched these guys panel themselves into something on the order of a shantytown house. Cardboard panels here, plywood sheets there. Whatever it takes to avoid all the problems caused by air drafts.

I've heard every excuse for bad welds and warped bends possible. The fact of the matter is, folks, that the fire is hot as hell, and just about any way that you go at it you are going to feel some hot drafts.

Using an electrode holder can help one a little for normal glass applications, but given new designs and regulations, electrode bends are becoming shorter and shorter. Unless the electrodes are very short, the glass will be too close to the plastic faces on channel letters.

These tiny heights (2-5/8" on an 8mm electrode) can only be done with extreme control. Using your fingers is about the only way. Sure you get burnt, but the bends usually stay together better, with a lot less stress.

Heat is something that your hands can get used to. We all have 'hot spots' at the fires, and it is best to know exactly where they are and use them, perhaps for annealing bends after they have been worked.

Remember, tunneling yourself off won't cure your problem. Every blockage of air creates another passage for that same draft.

To prove my point, my mother always marvels at the way that I never need any potholders in my kitchen. I can handle a lot more heat with my hands than the average person. It just comes from years of working with fires.

Don't fight it.

<Editor's note: This is Ted here, another one who picks up hot pots with bare hands. I love electrode holders, but not the pronged kind. (The pronged kind should all be melted into something useful, like Christmas tree ornaments.) It needs to be the brass kind with a sliding collar; I got mine from Montroy (Los Angeles) years ago for $10. These let you get a firm grip on the electrode, letting you twist or pull as need be without it slipping even slightly. I like my torches pretty hot (oxygen, ya know) and it would be inconcievable to get my fingers that close — there'd be nothing left to pick up pots with.>

(Joe 's Instant Neon, from page 6)

neon for ten months, and it would be hard to tell which one was which. You can make instant hits.

NN: A lot of artists and other people who have a tangential interest in neon aren't interested in going to school full-time. Eight hours a day is a real acid test, even for people who want a commercial-quality skill.

Joe: It's a big commitment. The trouble with three hours once a week: everybody thinks it's easy. Nobody thinks of it as glassblowing. So when you show them how to do it, they realize it's hard.

And half the people who want to work with it — say, architects and artists — generally get scared off.

The people who stayed knew what they were doing by the end of the class. And they knew whether they wanted to go on, or whatever.

From a teacher's point of view it's a dilemma, because you want people to commit, but when they commit it's going to be hard for them.

I used to tell them it was easy — and I had pretty good success with that, telling them it was easy and anybody could do it. It was pretty good because they believed me. They would stick with it. And so I was able to keep a lot of people in the class who normally would be afraid of it.

NN: JOE'S EASY NEON SCHOOL!

Joe: Yeah, I used to call it "instant" — Instant Neon. And I would give them this little list of things, saying "This is the easiest thing in the world."

And somebody who got stuck on it, I would work with 'em, or try and hide them (laugh). I'd say "Go outside," and I'd lock the door when they were out! So they wouldn't influence other people...

NN: I think there's this new constituency of people who are learning neon as a personal passion or a second career... who make their basements or garages into neon shops, and really get into it, but they can't go to school full-time. Do you think there's a good way for them to learn bending?

Joe: Yeah, you take Joe's Instant Class!

For those people, it's like piano: you come, and I'll show you how to make that particular sound, but you have to go home and practice it. I had a list of equipment, and it came out to be about $200-$300: one crossfire burner, a blower — for $300 they could get a setup with the hoses and the whole thing.

And some of them did it. They had a garage, and they would just go and hook up the gas, for their little individual shops. So, sure, that's exactly the way to do it.

NN: So for that kind of setup, even if you added a couple of torches, it would still be under a thousand bucks, and you wouldn't have to worry about bombarding, just go and pump your tubes somewhere else.

Joe: That's right, and some shops would do that for maybe ten or fifteen dollars. And students can get away for under a thousand dollars for the whole setup, with pipes and everything, and they can do their own bending.

Or you can teach it as a craft class, you know, like stained glass, where people just come, and it's project-oriented — that's the way it was taught before I got there. Everybody made a neon thing. At the end of the class they held it up and went "ooh."

So that's one approach. I thought that approach was off the wall, but now I don't think it's so bad. Of course they won't learn anything — you'll never get any nuclear scientists that way — but you'll get some pretty contented people.

NN: Yeah, someone who's not going to say at the end of class "Hey, look at my perfect angle bend!"

Joe: People don't understand that.

NN: Oh, people who work with it every day understand that. As a matter of fact, you've probably already given me abundant material for people to write more nasty letters to you: "Instant Neon! Who does that guy think he is?!"

Joe: Oh yeah, you'll get 'em, because nobody wants to admit that it can be done easily.

More suppliers...

Edward DeZuzio raves about **Lab Safety Supply (P.O. Box 1368, Janesville WI 53547; (800) 356-0783):**

"They are friendly and curious over the phone. Among other things they offer fire extinguishers, flameproof gloves and sleeves, and custom-sized floor mats. Cushion-lock matting, 30" by 72", is $73; many times it has saved a piece of glass that's been dropped, not to mention its anti-fatigue effect when standing all day...

"Glassblowing: An Introduction to Artistic and Scientific Flameworking" by Edward Carberry (available through Wale Apparatus Co.) contains sections on working with glass rods and tubing over different fires, the nature of glass, how to store it, and about 35 projects ranging from swan barometers to super cool merc traps that can be used on your manifold.

"Its handy glossary will explain the different types of glass and give the average 'I make signs' glassworker a host of terms to use when going for his next raise."

A Seattle friend sent his list of favorite and unusual suppliers, noting that all of them send info free of charge:

For burners and mixers:
J & P Machine & Tool Co.
22 DeLawanna Ave
Clifton, NJ 07014
(201) 779-6158; fax x0953

For "top of the line" vacuum instruments:
Teledyne Hastings / Raydist
P.O. Box 1275
Hampton, VA 23661
(804) 723-6531; fax x3925

For "Dual Range Manometer Model 1227":
Dwyer Instruments Inc.
1375 N. McCan St.
Anaheim, CA
(714) 630-6424; fax 666-8533

For scientific supplies:
Fisher Scientific
2170 Martin Ave.
Santa Clara, CA 95050
(408) 727-0660

For pumping systems and vacuum equipment:
Leybold Vacuum Products Inc.
5700 Mellon Road
Export, PA 15632
(412) 327-5700, 325-6551

Nancy Hannmann wrote that she had some interesting experiences with **The Society for Commercial Archeology**, which takes an active interest in preserving old signs.

The brochure says it "is a unique national organization concerned with the artifacts and structures, signs and symbols of the American commercial process. Encompassing both the celebrated and anonymous work of many of America's best designers, the mass-produced forms of the machine age, and the vernacular conceptions of local builders, these elements comprise a significant part of our national heritage.

"Features of the American commercial environment include ... highways, airports, and bus stations; ...gas station, diners, and motels; ...movie theatres, drugstores and department stores; ... resorts, fairgrounds and amusement parks. The SCA is concerned that these resources, while rapidly disappearing, are often considered too recent to be analyzed, recorded, or preserved.

"The goals of the Society are to promote public awareness and exchange of information, and to enourage the selective conservation of the commercial landscape." Write to them at **Room 5010, National Museum of American History, Washington, D.C., 20560.**

Precision Neon Laboratories has a video catalogue out — we recieved a copy to review, but being without a TV (and on a tight deadline to get this issue done) we can't tell you much, other than it's available from them at **(803) 794-5974 (fax 783-5909).**

As an aid to patternmaking, check out the Logitech hand scanner, "scanman plus." For $175 (prices vary; look through the ads in Computer Shopper magazine) this will scan into your IBM computer any image up to 4" wide by 14" long, up to 400 dots per inch. It includes software for manipulating the scanned image (a "paint" type program) and with even a cheap dot-matrix printer a decent (for patterns) printout can be made.

Mark Snyder takes a hard line on mercury safety in the neon shop:

I have been preaching for years not to do mercury repairs and to keep the shop area clean of mercury. One point that should be expanded on is the possible contamination of the worker's clothing. In this way the mercury is carried home and comtamination can affect everyone in the household.

I become very upset with people who argue about the cost of making a new mercury unit as opposed to repairing it. I simply ask them how many repairs they would be willing to trade for someone's life (not necessarily their own).

There are inexpensive vapor detectors available; the Williams detectors mentioned (NN #6) work very well. We have taken them and placed them in a sealed container at room temperature with a drop of mercury and observed that the sample area of the card turned from tan to dark gray within one hour. So the recommended sampling time of ten to fourteen days is quite effective at detecting even minute quantities of mercury vapor in the shop.

There is also a mercury spill paper available for placing on the pump table where mercury is inserted into the tubulation. If a spill occurs and lands on the paper, the mercury will break apart into a few droplets and stay on the paper instead of scattering in a thousand directions, thus allowing easy clean-up. We are also currently working on a mercury spill clean-up kit, to be available April 1.

Another safety device we have is a CO (carbon monoxide) detector. This is useful in any shop using an open flame, such as sign shops using welding equipment, as well as neon shops. They are inexpensive (about $10) and, unlike the mercury detectors, these are reusable. You simply flush them with fresh air (an increasingly rare commodity) to rejuvenate them.

<Another reader pointed us toward "Mercury, Man's Deadly Servant," an old National Geographic article from October 1972.>

BULLETIN BOARD

ATTENTION ALL NEON FOLKS ATTENDING THE NESA SIGN EXPO IN SAN FRANSISCO: If you would like to meet and eat with other tubebenders, please call Eileen Romano at (415) 537-9979 — Let's get together for a "Benders' Bitchin' Bash."

NEON SIGN COLOR POSTCARDS: Pontiac Indian, Buster Brown, Mobilgas Pegasus, Simple Simon, etc. Eleven assorted for $6.50. Fifty cards for $16.00. Davidson, 860 N. 26th St., Philadelphia PA 19130; (215) 232-0478.

Anyone who knows where **Stillman Young** is please call Kathy Petersen collect at (218) 547-3400.

Notes from a friend involved in the **Northwest Sign Show:**

"I thought it would be a lively lead-in to our seminar to give a quiz — well, it turned out to be not such a good idea. About a 99% fail rate, with a few people downright offended — HA!"

He reported on two seminars helpful to neon people: one on "the gas/air mixture for different burners, including proper set-up and plant upgrade," and one on vacuum technology, electrode processing and mercury hazards. As part of a presentation on the latter topic Roger Ligrano made mercury spill pickup devices of glass that were given away to participants.

<Any other helpful/instructional events going on out there?>

Tom Cramer of Just Neon in Warren OH is interested in "the material used in jigs for neon tubes. What is this material and from where can I purchase some of it? I am also interested in making my own electrodes. Where can I purchase the crimping tool used to seal the glass over the shell wire?" *<Well, if you want to go for the homemade and funky look, we have a friend who used beer cans for electrodes in one experiment. He's the same one who took home argon gas in a baggie, for making tiny lights in a rather low-tech setup...>*

Tama Starr of Artkraft Strauss in New York wonders why gypsies always have neon, and why it's usually purple...

Mark Snyder comments on thermal crayons and mercury stains: "We have tested crayons, liquids and pastes and have found all to be inaccurate when it comes to pumping neon.

"The problem seems to lie in what the material is subjected to. The material changes color (or consistency) through a chemical reaction caused by heat. But the tube is being bombarded by high voltage and current. The voltage is not all contained inside the tube; some of it leaks out (corona discharge).

"When you induce voltage and/or current into a chemical reaction the reaction changes, thus changing the end result; in this case, causing the crayon to change color before it should.

"I'm afraid that if your reader is going by the crayon method, his or her tubes are not getting hot enough. Our tests showed that the thermal materials we tested would turn color at an actual glass temperature of 150 to 175C, depending on material tested. An actual glass temperature of 200 to 225C is required, with 200 the absolute minimum.

"On mercury staining: All the major tubing coaters (Voltarc, EGL, Masonlite, and FMS) now have blue tubing that does not contain calcium tungstate, one of the primary causes (besides improper processing) of standard blue tubing discoloring. These new colors are well worth the higher price."

Renay Murray sent The Neon News's first poetry (or is it a blues song lyric?):

May your torches be clear not foggy,
May your pumper be conscious not groggy;
When your fingers burn yell out,
That's what glasswork's all about.

Phil Baker wishes to correct his error about his diffusion pump price: it was $575, not $750. He says he spent the rest on other stuff...

<Just as this issue was looking full, we got an eleven-page handwritten letter from Edward DeZuzio of Shadowmaker Neon in West Paterson NJ. Here's an excerpt:>

A strategy for Joseph Keller's complaint about people not understanding what a neon bender does:

"Don't give in to the 'you know, signs, like Budweiser' explanation. I was taught to manipulate glass by one of America's finest, Per Wallin. He told us go with it, make up your own words. For example:

Tube Bender: "Oh, hello, nice to meet you."

Victim: "Yes, same here. Chris tells me you're a tube bender.

TB: "Yes, that's right, and you're a computer programmer? Huh, ha, ha ha Ha HA HAAA AH HA..." (The laugh gets them curious.)

V: "What exactly is a tube bender?"

TB: "Well I'm in the luminous tube trade, you know, configuring double-backed glass combos with drop rise ninety-degrees in seven-hundred-degree flames and sterilizing the completed unit with a bombardment of water vapor, nitrogen, CO2 and other stuff."

V: "Oh, really? Wanna shoot some darts?"

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